

claims 32-34, 36 and 37 stand rejected over Chow et al in view of U.S. 5,612,254 (Mu et al), claim 35 stands rejected over Chow et al in view of U.S. 5,272,117 (Roth et al) and claims 38 and 39 stand rejected over Chow et al in view of Roth et al and further in view of Mu et al.

Claim 29 recites removing a part of the portion of the second insulating film which is exposed to the groove, and a part of the first insulating film under the portion of the second insulating film using the same etching mask. A non-limiting example of this is shown in the specification in FIGS. 21A-21E, where a portion of film 73 and a portion of film 72 are removed using the same etching mask to form contact hole 77.

In Chow et al, three insulating layers 5, 6 and 8 are formed. A groove is formed in insulating layer 8 at positions where wiring is to be provided, and a contact hole is formed in insulating layer 5. A window 7 is formed in insulating layer 6 prior to forming insulating layer 8. As described in column 3, lines 34-36, the groove, which is to be formed in the wiring formation area, must be aligned with reference to window 7. However, since window 7 is covered with insulating layer 8, it may be difficult to accurately align the groove with reference to window 7.

The groove is formed in formed in layer 8 using a mask (not shown) and the contact hole is formed in layer 5 successively using the same mask. As can be understood from FIGS. 2-6, window 7 and the grooves in layers 5 and 8 are not formed with the same etching mask. The window 7 is clearly formed before the layer 8 is deposited and thus the grooves in layer 8 and the contact hole in layer are not formed with the same etching mask used to form window 7. Also, no part of the portion of layer 6 exposed to the groove in layer 8 and a portion of layer 5 under a this portion are removed using the same mask.

According to claim 29, a part of the portion of the second insulating layer exposed to the groove and a part of the first insulating layer under this portion are removed using the

same etching mask, thus forming a contact hole reaching to the semiconductor substrate.

Chow et al clearly do not disclose or suggest such a method, and clearly teach away from the method of claim 29 by using different etching masks to form window 7 and the contact hole in layer 8 and layer 5. Accordingly, Claim 29 is clearly patentably distinguishable over Chow et al.

The Cochran et al reference is relied upon for teaching a second insulating film made of nitride, the Mu et al reference is relied upon for teaching a barrier layer made of Nb and Roth et al is relied upon for teaching that carbon is a known material that may be used in a thin passivation insulator. Even if these references are correctly characterized, such teachings do not remedy the deficiencies in Chow et al, as none of these references disclose or suggest the method in claim 29 where the same etching mask is used to remove a part of the portion of the second insulating layer exposed to the groove and a part of the first insulating layer under the portion, thus forming a contact hole reaching to the semiconductor substrate. Accordingly, claim 29 is clearly patentably distinguishable over the cited prior art and is in condition for allowance.

In claim 40 a groove is formed in the third insulating film having a bottom comprising a second insulating film, and a wiring material is formed in the groove. The step of forming the groove comprises etching through the second insulating film to expose the first insulating film while leaving a remaining second portion of the insulating film, and removing a third portion of the first insulating film to expose the substrate while leaving a remaining fourth portion of the first insulating film. In the method according to Chow et al, a window 7 is formed in layer 6 and layer 8 is formed to cover layer 6 and window 7. A groove and a hole are formed by etching layers 8 and 5. In forming the groove in layer 8, there is clearly no etching through the layer 6 to expose the layer 5 while leaving a remaining portion of layer 6

and etching through layer 5 to expose substrate 3. While layer 5 and substrate 3 are exposed in the process of forming the groove in layer 8, and there is no step of etching through layer 6 to expose the layer 5 disclosed or suggested in Chow et al. Claim 40 is therefore clearly patentably distinguishable over Chow et al. The remaining cited references do not remedy the deficiency noted in Chow et al., and thus claim 40 is patentably distinguishable over the cited prior art. The allowance of claim 40 is respectfully requested.

It is respectfully submitted that the present application is in condition for allowance and a favorable decision to that effect is respectfully requested.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.



Gregory J. Maier
Attorney of Record
Registration No. 25,599
Carl E. Schlier
Registration No. 34,426



22850

(703) 413-3000

Fax #: (703) 413-2220

GJM/CES:sjh

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IN THE CLAIMS

--29. (Amended) A process of fabricating a semiconductor device comprising [the steps of]:

forming a first insulating film on a semiconductor substrate;

forming a second insulating film on said first insulating film, said second insulating film being made of a material different from that of the first insulating film and having a thickness smaller than that of the first insulating film;

forming a third insulating film on said second insulating film, said third insulating film being made of a material different from that of the second insulating film and having a thickness larger than that of the second insulating film;

forming a groove in a region of said third insulating film, in which a wiring is to be formed, said groove having a bottom to which said second insulating film is exposed;

[forming a metal wiring in said groove; and]

removing a part of that portion of the second insulating film which is exposed to the groove, and a part of the first insulating film under the portion of the second insulating film, using the same etching mask, and thus forming a contact hole reaching to the semiconductor substrate[, wherein the contact hole is buried with a metal in the step of forming a metal wiring in said groove]; and

burying the groove and the contact hole with a metal to form a metal wiring in said groove and a metal contact in said contact hole.--